

the only true lizard from strata of pre-Jurassic age. The specimen is to be described in the first number of a new journal, *Records* of the Albany Museum.

THE National Museum of Dublin was enriched last year by the gift of a very extensive herbarium of Irish plants, collected by the late Mr. Levinge, of Co. Westmeath. In the *Scientific Proceedings* of the Royal Dublin Society Dr. Johnstone and Miss Knowles have published a list of plants, for which the localities furnish new records, whether for the county or for other parts of Ireland.

In the *Journal of Botany* (November) Dr. Rendle gives a description of the grass *Glyceria festucaeformis*, new to Britain, which was discovered by Mr. Praeger on the north-east coast of Ireland. This is an unexpected locality for a grass which is regarded as a Mediterranean type. In the same journal there appear two lists of mosses and hepatics, the one for Worcestershire recorded by Mr. Bagnall, the other contributed by Canon Lett of collections made in South Donegal.

In a *Bulletin* issued by the U.S. Department of Agriculture which deals with the diminished flow of the Rock River, Mr. F. G. Schwarz discusses the question how far the water supply of a river is affected by drainage and deforestation. He contends that the actual diminution in amount is unimportant as compared with the resulting fluctuations in the flow of water, especially where the melting snow provides an appreciable source of the supply. As a remedy it is suggested that, in addition to increasing the area of forest, it would probably pay, where the land is valuable, to construct artificial reservoirs for regulating the supply of water.

THE complex series of movements which are carried out by the flowers of *Sparmannia africana*, a well-known greenhouse shrub, from the opening of the buds to the setting of the fruit has been carefully studied by Mrs. D. H. Scott, and is described in the *Annals of Botany*. In the latter part of the paper the writer gives an account of experiments which were carried out in order to show these movements by means of a kinematograph, and in which success was ultimately attained by the use of an instrument called after the maker the Kammatograph. In the Kammatograph, by means of eccentric rotation, exposures are made of successive portions of a film coated on a glass disc, so that a series of spirally arranged negatives is obtained.

THE latest Rationalist Press Association reprints, published by Messrs. Watts and Co., are John Stuart Mill's "On Liberty" and "Haeckel's Critics Answered," by Mr. Joseph McCabe. Both are published at sixpence.

MESSRS. MACMILLAN AND CO., LTD., have published in their sixpenny series "Essays Ethical and Political," by the late Prof. Huxley. The Romanes lecture delivered in 1893 on "Evolution and Ethics" is included, together with the Prolegomena written in the following year.

A NEW edition of Mr. G. Hale Puckle's "Elementary Treatise on Conic Sections and Algebraic Geometry" has been published by Messrs. Macmillan and Co., Ltd., at 7s. 6d. Alterations in the treatment of the general equation of the second degree have been made, and more simple methods of reduction and of finding the foci, eccentricities and axes are given.

WE have received the fifth half-volume of the "Natural History of Animals," by Prof. J. R. Ainsworth Davis, now being published by the Gresham Publishing Company.

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Previous volumes of the work have already been reviewed in these columns; the present part deals fully with animal movement in eleven chapters, running to 280 pages, and is illustrated by nearly 250 figures and three coloured plates.

THE second volume of Prof. H. Pellat's "Cours d'Électricité" has been published by M. Gauthier-Villars, of Paris, at 18 francs. The publication of the first volume, which deals with electrostatics, Ohm's law, and thermo-electricity, was announced in these columns in 1901. The present volume is concerned with electrodynamics, magnetism, the phenomena of induction, electromotors, electric oscillations, electromagnetic measurements, and similar subjects. A third volume, yet to be published, will complete the course, and will discuss electrolysis, electrocapillarity, and associated subjects.

THE additions to the Zoological Society's Gardens during the past week include a Campbell's Monkey (*Cercopithecus campbelli*) from West Africa, presented by Mr. J. F. Purser; a Macaque Monkey (*Macacus cynomolgus*, var.) from India, two African Brush-tailed Porcupines (*Atherura africana*) from West Africa, a Rose-Hill Parrakeet (*Platycercus eximius*) from Australia, deposited.

### OUR ASTRONOMICAL COLUMN.

SOLAR PHENOMENA AND MAGNETIC STORMS.—In a communication presented to the Paris Academy of Sciences, M. Quénisset directs attention to the fact that, whilst the passage of a large group of sun-spots across the sun's central meridian on October 31 coincided with a terrestrial magnetic storm of exceptional activity, the passage of a much larger group on October 11 was marked by a very faint perturbation of the magnets. In explanation of this apparent anomaly he points out that the smaller group of spots was surrounded by an immense tract of faculae, so bright that it was found possible to photograph them by the ordinary method, even when they were on the sun's central meridian, whilst scarcely any faculae attended the larger and earlier group. From this fact M. Quénisset arrives at the conclusion, which is now becoming generally accepted, that it is the prominences and faculae on the solar surface rather than the spots which are so closely related to terrestrial phenomena, and suggests that the monochromatic photographs of the solar surface obtained by the Hale-Deslandres method, such as are now being taken at Yerkes, South Kensington, and Meudon, will provide valuable data for the discussion of the inter-relation of solar and terrestrial phenomena (*Comptes rendus*, November 9).

OBSERVATIONS OF JUPITER.—In the November number of the *Bulletin de la Société astronomique de France*, M. Ch. Lukacs, of Budapest, publishes the results of his observations of Jovian phenomena during 1902; the following are the principal conclusions derived from the observations:—(1) The Red Spot has totally disappeared except at its eastern extremity; (2) the southern equatorial band shows remarkable activity in its northern parts; (3) the equatorial band, formerly the scene of the greatest activity of Jupiter's atmospheric forces, has now become absolutely uniform; (4) the northern equatorial band is growing gradually fainter from the south towards the north; (5) the south temperate band presents a curious depression just above the eastern extremity of the Great Red Spot, and, on August 6, two very sharply defined deviations in the course of this band were observed, the one at 125°, the other at 175° of Jovian longitude; these deviations were similar to those observed by the late Prof. Keeler on August 28, 1900; (6) the colour of the equatorial bands was a brownish ochre; the zones, generally, appeared to be of a whitish yellow, with the exception of the tropical zones, which were white, and the polar zones, which had a grey tinge mixed with yellow.

In his communication M. Lukacs gives the details of his individual observations and twelve excellent drawings of the planet as it appeared on various occasions during 1902.

THE FORMS OF THE RING AND DUMB-BELL NEBULAS.—In a recent number (539) of the *Astronomical Journal* Prof. J. M. Schaeberle stated that by using a short focus reflector he had obtained photographs of the Ring nebula which plainly showed that this object had a clockwise spiral form. In several fainter photographs obtained since, where faint nebulosities are shown only at the extremities of the major axis of the ellipse, he noticed a decided similitude in shape to the dumb-bell nebula in Vulpecula, and was induced to photograph the latter object in order to see if that, too, was a spiral; the photographs obtained show that it is, but in this case the spiral is counter-clockwise.

From these photographs of the two objects Prof. Schaeberle concludes that they were formed, in each case, by simultaneous emissions of matter from a central mass, several streams leaving the parent body in diametrically opposite directions, and with various velocities, at the same time and forming inner and outer streams of which the inner would travel round the central body several times while the outer streams were making one revolution; where these two streams meet and are superimposed, the nebulosity is much brighter, and exhibits the forms usually attributed to these objects. If we suppose that the outer boundary of the nebula, as it is usually seen, represents the exterior limit of the inner streams, and that the general arrangement of the nebula is due to gravitational forces, this theory demands that the outer streams should extend much further than is generally shown on photographs, and, in proof of this, Prof. Schaeberle has obtained photographs which show that various exterior nebulosities, and many of the adjacent faint stars, are probably part of one huge structure of which the Ring nebula is only the central condensation.

Similar proofs have been obtained to show that the formation of the Dumb-bell nebula may be explained by the same hypothesis, for on several photographs it is plainly seen that various wisps of nebulosity, which are concave towards the Dumb-bell and include several streams of faint stars, are, with the Dumb-bell, probably parts of the same original mass (*Astronomical Journal*, No. 547).

#### BIOLOGICAL WORK IN SOUTH AFRICA.

THE issue of the report of the Government biologist (Dr. J. D. F. Gilchrist) of the Cape of Good Hope for 1901 affords a favourable opportunity for directing attention to the energy with which biological investigations are being carried on in South Africa. Several volumes of the excellent "Fauna of South Africa," under the editorship and part authorship of Mr. W. L. Sclater, director of the Cape Town Museum, have from time to time been reviewed in our columns, where reference has likewise been made to various papers in *Marine Investigations in South Africa*, the *Annals of the South African Museum*, and other local publications. From some of these notes we venture to repeat extracts on the present occasion. It may be added that, apart from local publications, Mr. O. Thomas, of the British Museum, in papers published in the *Annals and Magazine of Natural History*, has been able to increase our knowledge of the mammals of South Africa, thanks to collections sent to this country by Colonel Sloggett, R.A.M.C.

The Government biologist commences his report with an account of the trawling operations recently undertaken off the Natal coast at the request of the Government of that flourishing colony. The Natal coast is by no means promising for trawling, and as much money had been spent on previous occasions with no good results, and the recent trip proved equally unsatisfactory, the Government was advised to devote its attention to the development of line fishing, and to rely on the Cape trawling-grounds for its supply of soles. During the operations many new forms of marine life were procured, which are being investigated by specialists. On the return of the surveying vessel to Cape waters, a new trawling-ground was discovered, which promises to yield a valuable supply of food-fish.

As regards inland-fisheries, breeding operations have been seriously hampered owing to the hindrances inseparable from the institution of martial law in the country, while an unfortunate case of poisoning did not tend to mend

matters. Nevertheless, the director is able to report that the rainbow-trout are in a very satisfactory condition, and that carp are likewise flourishing.

The report includes a reprint from *Marine Investigations* of Mr. R. Kirkpatrick's first paper on the sponges obtained during the Natal and Cape cruises. The third part of this contribution (*Marine Investigations*, vol. ii. part iii.) is just to hand. Several genera and many species are described as new, and the author directs attention to a notable resemblance between the sponge-fauna of South Africa and that of Australia.

A second paper reproduced in Dr. Gilchrist's report is one by Mr. G. B. Sowerby on South African molluscs, in which is described a new species of *Volutilithes*, making the third existing representative of that genus, which was first described from the Barton Clay. Another contribution to this subject by the same author appears in vol. ii. of *Marine Investigations*, where a number of new forms of *Pleurotoma* and *Conus*, as well as representatives of other genera, are described.

In the same volume the South African corals of the genus *Flabellum* receive attention at the hands of Mr. J. S. Gardiner who pays special attention to the anatomy and development of these organisms, and emphasises the importance of studying the polyp as well as the corallum if we hope to gain any real idea of their true relationships.

This volume of *Marine Investigations* also contains some valuable notes by Dr. Gilchrist on the development of South African fishes. These notes have an important bearing on certain disputed points connected with the Cape fisheries. Many fishermen urge, for instance, that the spawn of several of the commoner food-fishes is developed on or near the sea-bottom, and is, in consequence, seriously damaged by trawling. To this the author replies that, since in northern waters it has been demonstrated that only one valuable food-fish, the herring, has deep-lying spawn, and since the Cape seas are the home of only a small species of herring of little or no commercial value, it is probable that the damage done by trawling in South African waters has been overestimated.

Under the title of "Rhynchotal Miscellanea," Mr. W. L. Distant, in the *Annals of the South African Museum* (vol. ii. pt. ix. art. 12 and vol. iii. pt. ii. art. 3), publishes a series of notes on the bugs of the country, with descriptions of some new genera and a large number of new species.

In vol. iii., part iii., of the same publication, Mr. G. A. Boulenger describes six new forms of perch-like fishes from the Natal coast, all of which are illustrated in well executed plates, and belong to previously known generic types.

Part iv. art. 5 of the same volume is devoted to descriptions by Dr. W. F. Purcell of new spiders from South Africa belonging to five families.

We must likewise refer to a communication in the *Agricultural Journal of the Cape of Good Hope* for October last, in which the Government entomologist, Mr. C. P. Lounsbury, records an important discovery in regard to the propagation of the South African sheep and goat disease known as "heartwater." The bont-tick has been found to be the only medium of spreading the disease. A single specimen, if fed on a heartwater-sick animal as a larva or "seed" tick, is capable of transmitting the fatal malady. An animal pastured on veld infested by tick may drop thousands of larvæ during its illness, and thus serve to the extermination of a flock. The mortality amongst flocks brought to the coast where the tick is abundant is thus explained. Pathogenic larvæ retain their dangerous character until adult. They may take their second feeding on an ox or a non-susceptible goat, and in the final stage get on to a susceptible sheep or goat and give it fever. On the other hand, the disease appears non-transmissible through the egg-stage, and the species is normally non-pathogenic in all stages. A farm may be infested with bont-tick, yet be free from heartwater. Since the other common species are innocuous, it is hoped that by keeping down the bont-tick the disease may be stamped out.

By no means the least important memoir in the series before us is one by Mr. A. C. Seward on the fossil floras of Cape Colony, forming part i. art. 1 of the fourth volume of the *Annals*. The first section deals with the flora of the Uitenhage series, which is regarded as of Wealden rather than of Jurassic age. The Stormberg, or upper